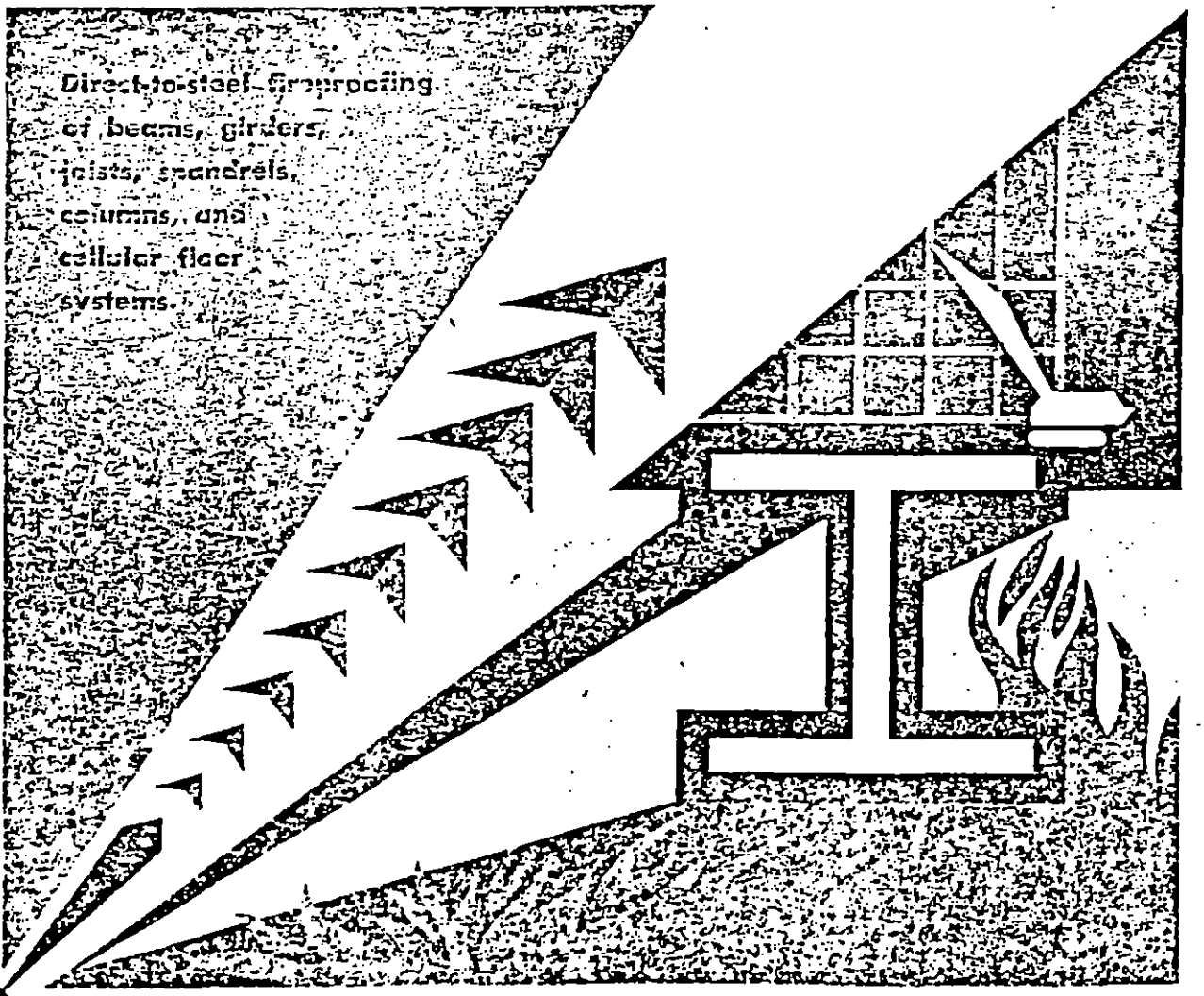
1966-67 BLAZE-SHIELD®
fireproofing



USM
UNITED STATES MINERAL PRODUCTS COMPANY
Stanhope, New Jersey 07874

AIA FILE 21

PLAINTIFF'S EXHIBIT
PX-447

BLAZE-SHIELD
fireproofing **TYPE D**

CAFCO BLAZE-SHIELD Type D offers a new concept in machine applied fireproofing. A unique formulation of virgin asbestos fiber, highly refined white mineral fiber and proprietary binders, BLAZE-SHIELD Type D provides optimum economy and improved job application by eliminating bonding adhesive, sealer and tamping. Further, scaffolding may be eliminated in those instances where job layout permits application directly from the floor.

Truly a one-coat application, BLAZE-SHIELD Type D can be built up to any required thickness in one pass and provides a durable finished surface which will not dust or flake. Detailed independent laboratory test information is available on request.

Tested and listed by Underwriters' Laboratories, Inc. (ULI), for structural fireproofing applications, a large scale testing program has incorporated trench headers and header ducts to provide complete design flexibility.

Machine applied directly to structural steel beams, girders and columns and to metal floor or roof systems, BLAZE-SHIELD Type D utilizes conventional CAFCO application equipment. Thoroughly job-tested, BLAZE-SHIELD Type D offers these additional features:

ACOUSTICAL ABSORPTION — Application of fiber to deck and beams serves as a sound absorbent above open perforated hung ceiling systems; pads are eliminated; room-to-room sound transmission is reduced. Refer to Sound Absorption Coefficient Table, page 4.

ALL-WEATHER APPLICATION — With simple job precautions, application is possible under most temperature conditions. [illegible] wall erection may be preceded by fireproofing work; [illegible]edules are maintained; occupancy dates are met; job [illegible] costs are reduced.

REDUCTION IN DEAD LOAD — BLAZE-SHIELD Type D weighs approximately 1.25 pounds per board foot. Lighter than many "lightweight" fireproofing materials, it often permits savings in framing and foundation costs.

PERMANENCE OF PROTECTION — Under normal structural movement of framing, floor or roof sections, BLAZE-SHIELD Type D maintains high bond strength without surface cracking or spalling. Shrinkage cracks, resulting in limited effective fire retardancy, are eliminated.

ARCHITECTURAL SPECIFICATIONS BLAZE-SHIELD Type D

GENERAL

SCOPE — This section shall include all materials, equipment and labor necessary for the application of fireproofing materials in accordance with terms and conditions of the contract documents.

PRODUCT QUALIFICATIONS — The manufacturer of the material shall have the approval for the applications specified. Such approvals are to include those of the pertinent municipal building authorities and insurance rating boards. The manufacturer shall provide laboratory test data to these authorities for approval.

CONTRACTOR'S QUALIFICATIONS — The contractor shall be licensed for this type of work by the manufacturer of the fireproofing materials. He shall use materials and application equipment approved by this manufacturer. Work shall be executed in strict accordance with the manufacturer's specifications and instructions.

MATERIALS

BONDING ADHESIVE — None required.

FIREPROOFING — The fiber shall be a factory quality controlled and formulated mix consisting of 100% inorganic virgin Crysotile asbestos fiber and small pellet, white mineral fiber, combined with proprietary binders. Fibers shall be CAFCO BLAZE-SHIELD Type D as manufactured by United States Mineral Products Company (Canadian subsidiary—Columbia Acoustics & Fireproofing Company (Canada) Ltd.), or approved equal, and shall be supplied to the job site in sealed paper bags, properly marked and labeled to show the inspection of Underwriters' Laboratories, Inc. or Underwriters' Laboratories of Canada for the application specified.

TRANSPARENT OVERSPRAY — None required.

WORK OF OTHER SECTIONS

EXAMINATION OF EXISTING WORK — The contractor shall examine all work prepared by others which is to receive the work of this section and report in writing to the general contractor all conditions not acceptable for application of fireproofing. Commencement of work constitutes acceptance of the surfaces prepared by others.

UTILITIES — Adequate ventilation, heat, light, electric power and water shall be provided by others.

PREPARATION FOR WORK OF THIS SECTION — All clips, hangers, clamps, supports, sleeves and other attachments to the base surfaces, as covered by other sections of these specifications, are to be placed by other contractors prior to commencement of work by this section.

INSTALLATION

JOB CONDITIONS — Applications shall be started only after the contractor is satisfied surface and weather conditions are acceptable. Surfaces shall be reasonably clean and free of dirt, grease, oil, loose plaster, rust scale, loose paint or other conditions which would tend to prevent good adhesion. Freezing weather applications shall follow the manufacturer's recommendations.

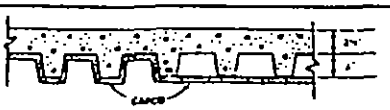
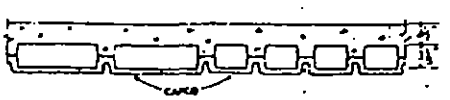
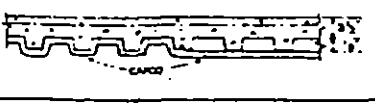
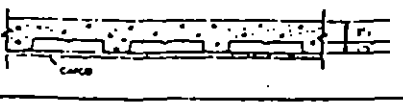
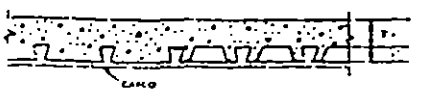
APPLICATION EQUIPMENT — Fibers shall be applied with manufacturer-approved equipment.

PROCEDURE — Fibers shall be applied to the required thickness without tamping.

CLEANING — After completion of work, the contractor shall sweep clean all adjoining walls and floors upon which fiber has been deposited.

TABLE OF FIRE RETARDANT RATINGS — BLAZE SHIELD TYPE D AND BLAZE-SHIELD STANDARD

FLOORS — ROOFS — CEILINGS

SYSTEM	HOURS	THICK-NESS	AUTHORITY	BLAZE-SHIELD Type D	BLAZE-SHIELD Standard	CONSTRUCTION
FLUTED - FLAT FLOOR OR ROOF UNITS	2	½"	ULI=R3789-3	X	X	
FLUTED - FLAT FLOOR UNITS INCLUDING TRENCH HEADER*	3	½"	ULI=R3789-3	X	X	
	3	½"-⅝"	ULI=R3749-11	X		
CELLULAR FLOOR OR ROOF UNITS, INCLUDING TRENCH HEADER*	2	½"-⅝"	ULI=R3749-12	X		
STANDARD HEADER*	3	⅝"-¾"	ULI=R3749-13	X		
FLUTED - FLAT FLOOR OR ROOF UNITS, INCLUDING TRENCH HEADER*	2	¾"-1½"	ULI=R2689-7	X		
	3	1¼"-1⅝"	ULI=R2689-7	X		
STANDARD HEADER*	3	1¼"-1¾"	ULC=60T56	X	X	
	4	1½"-2¼"	ULC=59T196	X	X	
PANEL FLOOR OR ROOF UNITS	3	¾"	ULI=R3749-8	X	X	
FLUTED-FLAT FLOOR OR ROOF UNITS, INCLUDING TRENCH HEADER*	2	2½"	ULC=60T97	X	X	
STANDARD HEADER*	3	2½"	ULI=R3749-20	X		

BLAZE-SHIELD *fireproofing* STANDARD

CAFCO BLAZE-SHIELD STANDARD is a mill quality control blend of virgin asbestos fiber, highly refined white mineral fiber and proprietary binders. Tested and listed by Underwriters' Laboratories, Inc. (ULI) and Underwriters' Laboratories of Canada (ULC) for fireproofing applications, code acceptance has been registered by major municipal building departments throughout the United States and Canada and in many countries overseas.

PRODUCT FEATURES

DUST FREE APPLICATION — An improved BLAZE-SHIELD STANDARD formulation eliminates application dustiness generally associated with conventional sprayed fiber products. Respiratory hazards, clean-up time and expenses are minimized.

JOB TESTED INTEGRITY — BLAZE-SHIELD STANDARD out-performed other fireproofing media when exposed to severe fire temperatures on major high-rise structures. CAFCO applications have been credited with restricting fire spread and preventing serious damage.

CORROSION PREVENTION — Tested in accordance with ASTM B-117 and Federal Specification MIL-E-5272A, CAFCO protected, shop painted steel evidenced no corrosion under severe exposure conditions. Rust preventive properties are superior to the combination of shop and field painting; costly field painting may be eliminated.

THERMAL INSULATION — CAFCO treated spandrels, roof decks and floor units reduce heating and air conditioning costs. insulation at roof set backs may be eliminated. BLAZE-D STANDARD provides a thermal conductivity (k) value of 0.27.

PLUS

ALL-WEATHER APPLICATION

REDUCTION IN DEAD LOAD

PERMANENCE OF PROTECTION

ACOUSTICAL ABSORPTION

ARCHITECTURAL SPECIFICATIONS
BLAZE-SHIELD STANDARD

GENERAL

SCOPE — See BLAZE-SHIELD Type D specification

PRODUCT QUALIFICATIONS — See BLAZE-SHIELD Type D specification

CONTRACTOR'S QUALIFICATIONS — See BLAZE-SHIELD Type D specification

MATERIALS

BONDING ADHESIVE — Bonding adhesive, where required, shall be a milky white, latex-type water emulsion which shall be unaffected by water, water vapor, condensation, aging or freezing once it has set. Shall be CAFCO ADHESIVE as supplied by the United States Mineral Products Company (Canadian subsidiary—Columbia Acoustics & Fireproofing Co. (Canada) Ltd.), or approved equal.

FIREPROOFING FIBER — The fiber shall be a factory quality controlled and formulated mix consisting of 100% inorganic virgin Crysolite asbestos fiber and small pellet, white mineral fiber, combined with 100% inorganic binders. Fibers shall be CAFCO BLAZE-SHIELD STANDARD as manufactured by United States Mineral Products Company (Canadian subsidiary—Columbia Acoustics & Fireproofing Company (Canada) Ltd.), or approved equal, and shall be supplied to the job site in sealed bags, properly marked and labeled to show the inspection of Underwriters' Laboratories, Inc. or Underwriters' Laboratories of Canada for the application specified.

TRANSPARENT OVERSPRAY — Overspray, where required, shall be transparent and unaffected by moisture; shall be CAFCO SEALER as supplied by United States Mineral Products Company (Canadian subsidiary—Columbia Acoustics & Fireproofing Company (Canada) Ltd.), or approved equal.

WORK OF OTHER SECTIONS

EXAMINATION OF EXISTING WORK — See BLAZE-SHIELD Type D specification

UTILITIES — See BLAZE-SHIELD Type D specification

PREPARATION FOR WORK OF THIS SECTION — See BLAZE-SHIELD Type D specification

INSTALLATION

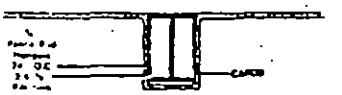
JOB CONDITIONS — See BLAZE-SHIELD Type D specification

APPLICATION EQUIPMENT — See BLAZE-SHIELD Type D specification

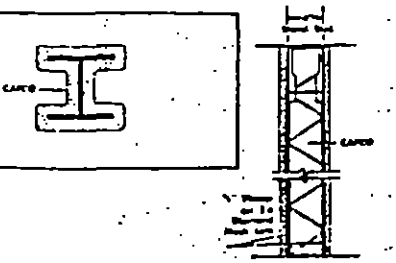
PROCEDURE — All surfaces to be treated shall be primed with CAFCO ADHESIVE. Fibers shall be applied and tamped to required thickness and oversprayed, where required, with CAFCO SEALER.

CLEANING — See BLAZE-SHIELD Type D specification

BEAMS — GIRDERS — SPANDRELS

SYSTEM	HOURS	THICKNESS	AUTHORITY	BLAZE-SHIELD Type D	BLAZE-SHIELD Standard	CONSTRUCTION
BEAMS, GIRDERS, SPANDRELS	2	½"	ULI=R3749-6		X	
	3	⅝"	ULI=R3789-2		X	
	4	½"	ULI=R3749-13	X		
WRAPPED BEAMS, GIRDERS, SPANDRELS, JOISTS	3	⅝"	ULI=R3749-18	X		
	4	1"	ULC=60T97	X	X	

COLUMNS

SYSTEM	HOURS	THICKNESS	AUTHORITY	BLAZE-SHIELD Type D	BLAZE-SHIELD Standard	CONSTRUCTION
COLUMNS AND COLUMN CAPS	3	1¼"	ULI=R3749-10†	X		
	4	1⅜"	ULI=R3749-9†	X		
	2	1¼"	ULI=R3749-19	X	X	
	3	1¾"	ULI=R3749-19	X	X	
	4	2⅛"	ULI=R3749-19	X	X	

WALLS

SYSTEM	HOURS	THICKNESS	AUTHORITY	BLAZE-SHIELD Type D	BLAZE-SHIELD Standard	CONSTRUCTION
WALLS	4	4"	ULI=R3749-21	X		

† For application to columns 14WF228 or greater

ULI — Underwriters' Laboratories of Canada / ULI — Underwriters' Laboratories, Inc

0011707

BLAZE-SHIELD Type H

Providing a harder, denser application, BLAZE-SHIELD Type H is formulated to provide an aesthetic, fissured, travertine-type finish for exposed applications where finished appearance and damage resistance are of prime importance. Equally suited to flat or vaulted ceilings, hyperbolic paraboloids, thin-shell barrel roofs, or other ceiling or roof configurations, BLAZE-SHIELD Type H provides an incombustible acoustical finish which provides excellent sound absorption and sound attenuation factors. The inorganic fibers and binders are rot-proof, vermin proof and are unaffected by water or water vapor upon setting. The monolithic coating absorbs normal structural movement without surface cracking or spalling.

SOUND ABSORPTION

Product & Thickness	Base	Coefficients						NRC
		125	250	500	1000	2000	4000	
¾" BLAZE-SHIELD STANDARD	Metal Lath	.49	.65	.88	.93	.90	.87	.85
¾" BLAZE-SHIELD STANDARD	Solid	.51	.34	.52	.88	.99	.93	.70
½" BLAZE-SHIELD TYPE D	Deck-Beams	.33	.55	.80	.99	.99	.97	.85
½" BLAZE-SHIELD STANDARD and ¼" BLAZE-SHIELD TYPE H	Solid	.09	.22	.61	.93	.85	.77	.65
¾" BLAZE-SHIELD TYPE H	Metal Lath	.46	.65	.75	.81	.89	.87	.80
¾" BLAZE-SHIELD TYPE H	Solid	.29	.21	.45	.76	.96	.99	.60

Tests conducted in accordance with ASTM-C-423-60T by Riverbank Acoustical Laboratories, Geneva, Illinois, or Cedar Knolls Acoustical Laboratories, Cedar Knolls, N. J.

Thermal Conductivity

(k factor) — BTU/inch/hr./sq.ft./F°

	Mean Temperature °F	k Factor
BLAZE-SHIELD STANDARD	75°	0.27
BLAZE-SHIELD TYPE D	75°	0.34
BLAZE-SHIELD TYPE H	75°	0.34

INDUSTRIAL ROOF-DECK APPLICATIONS

Application of a ¾" thickness of CAFCO BLAZE-SHIELD to the underside of conventional metal roof deck construction qualifies the roof assembly as "Acceptable Class I Construction" under classifications established by the Associated Factory Mutual Fire Insurance Companies.

Class II combustible metal deck assemblies may be converted to Class I construction through application of CAFCO BLAZE-SHIELD to existing roofs.

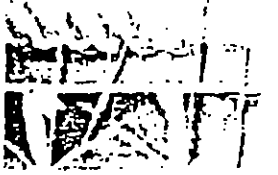
Contact local Factory Mutual affiliated company representatives or write us for additional details.

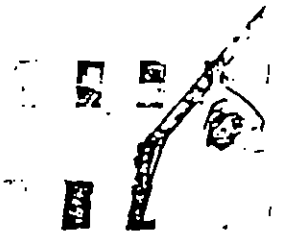
OTHER CAFCO PRODUCTS

CAFCO HEAT-SHIELD — Provides a direct-applied, continuous incombustible insulating blanket with a thermal conductivity (k) value of 0.26 at 75°F. Ideal for thermal insulation of pre-engineered metal buildings and other applications. Write for complete product information.

CAFCO POWER-SHIELD — A mill quality controlled blend of asbestos and mineral fibers, with proprietary binders, specifically formulated for thermal insulation in critical industrial applications. Write for complete product information.

CAFCO SOUND-SHIELD "85" — Answering an industry need for a harder, whiter, spray-applied ceiling finish providing predictable acoustical performance, SOUND-SHIELD "85" surpasses the performance characteristics of most spray or trowel applied acoustical ceiling materials. Refer to folders 14d/Us and 12a/Us in 1967 Sweet's Architectural and Industrial Construction Catalog Files.





CAFCO BLAZE-SHIELD TYPE "D"
Dust free application direct to
without adhesive or tamping. Noz
Project — IBM Office Building, F
Architect — Vincent Kling and A
General Contractor — Basic Cons
CAFCO Contractor — William Arms

PROMINENT BLAZE-SHIE

NORTHEAST —

American Cyanamid Building —
Vincent Kling and Associates
Union Carbide Building — New
Skidmore, Owings & Merrill
Liberty Mutual Building — Bost
Perry, Shaw, Hepburn & Dean
Marine Inland Grace Trust Co. B
Skidmore, Owings & Merrill
IBM Building — Philadelphia
Vincent Kling & Associates
Gateway Center — Pittsbur
Harrison & Abramovitz

SOUTH —

Home Security Building — Durha
Small and Boaz
Lone Star Gas Building — Dallas
Thomas & Jameson
First National Bank Building —
Kemp, Bunch & Jackson
University Towers — El Paso
Garland — Hilles
Allen Towers — New Orleans
Shaw Metz & Associates
Moissant Airport — New Orleans
Goldstein — Parham & Labouisse
230 Peachtree Street — Atlanta
Edwards & Portman

MIDWEST —

United Insurance Building — Chic
Shaw Metz & Associates
Ohio National Building — Cincinn
Potter, Tyler, Martin, Roth
National Cash Register — Chicag
Naess and Murphy
Bell Telephone Building — Davent
Louis C. Kingscott & Associates
Burroughs Office Building — Detr
Charles Vatentine
Federal Office Building — Clevela
General Services Administration

WEST —

Fireman's Fund Building — Los An
Heusser & Homolka
American Trust Building — San Fr
Ashley, Keyser & Runge
Federal Office Building — Juneau
General Services Administration
Lincoln Building — Spokane
Wells Fargo Building — San Franc
John Graham

UNITED STATES MINERAL PRODUCTS CO.
Stanhope, New Jersey 07874
Telephone 347-1200 Area Code 201

UNITED STATES MINERAL PRODUCTS COMPANY

SINCE 1875

STANHOPE, NEW JERSEY 07874

TECHNICAL BULLETIN C-940

August 12, 1966

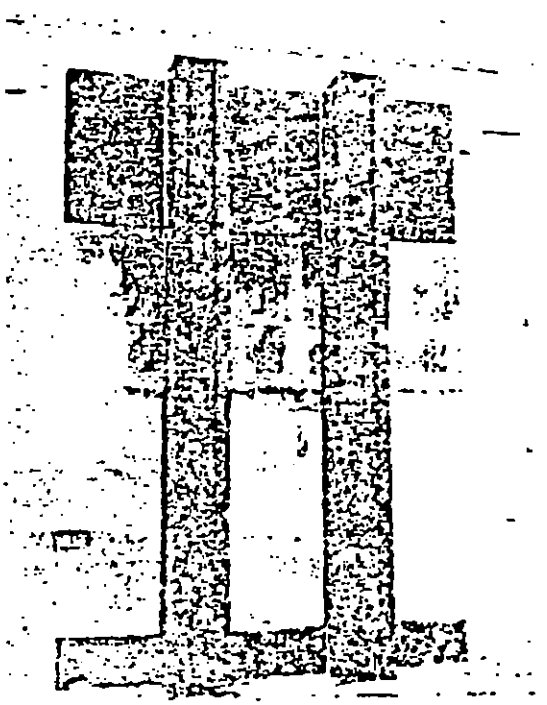
USM RESEARCH - - - COLUMN FIREPROOFING
RAIN EXPOSURE AND WEATHERING TEST

A full scale mock-up consisting of two columns a full story high (12 feet) connected by means of a spandrel plate was constructed of wood and covered with hardboard. The mock-up was constructed such that the ground level would be at the same level as the floor level in the actual building; see Figure 1.

The entire assembly was placed outdoors and sprayed with 1" of BLAZE-SHIELD Type D fiber on July 13, 1965; see Figures 2 and 3. Some 16 hours after completion of spraying the assembly was exposed to the erosive effect of impinging water jets, one directed at each column; see Figure 4. The flow from each jet was approximately 3 gallons per minute.

The water jets were kept on for 6 full hours. This amounted to approximately 21 inches of water falling on the assembly, which is much in excess of any rainstorm one would normally experience. This rainfall is greater than a six month rainfall in this area.

The water jets were turned off after 6 hours of exposure and photographs of the assembly were taken. The only place any fiber had come loose from the assembly was on the top portion of the lower spandrel plate; see Figures 5 and 6. This is a direct result of the water collecting on the lower edge of the upper spandrel plate and falling down 8 feet onto the lower spandrel top edge.



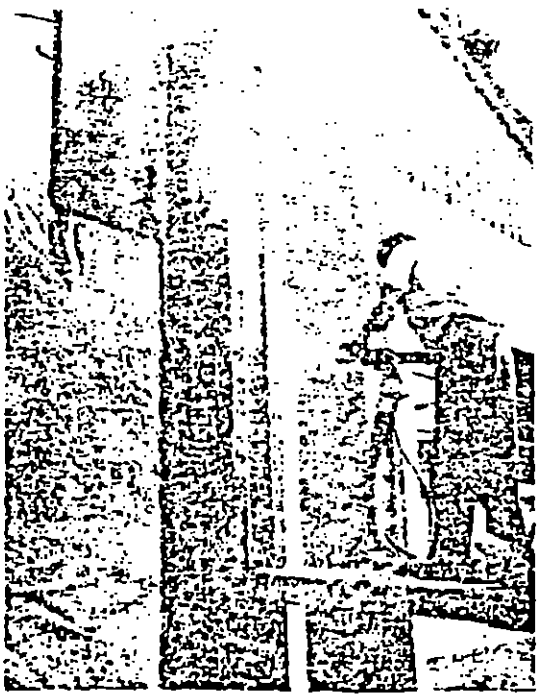


Figure 3
Fireproofed Assembly

Figure 4
Impinging water jets directed at columns

Figure 5
View after 6 hour water exposure
(picture taken from left side)

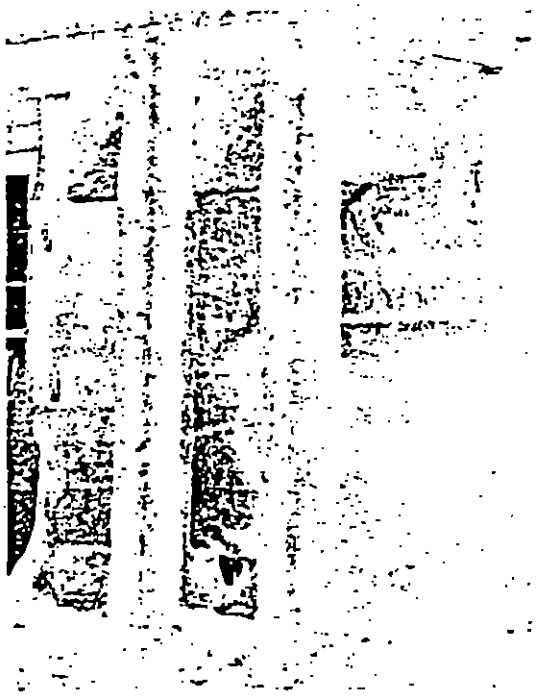


Figure 6
View after 6 hour water exposure
(picture taken from right side)

On July 13, 1966, exactly one year later, the assembly was inspected and photographs taken. During the winter approximately 48 inches of snow had fallen, while from January 1, 1966-18 inches of rain had accumulated. The fiber is in excellent condition, is firm to the touch and has not worn down under the year's exposure to the weather; see Figures 7 and 8.

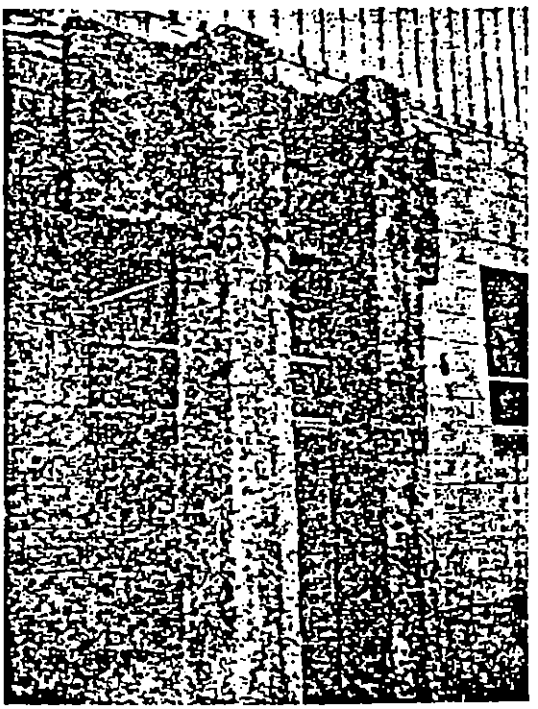


Figure 7
Assembly looking right

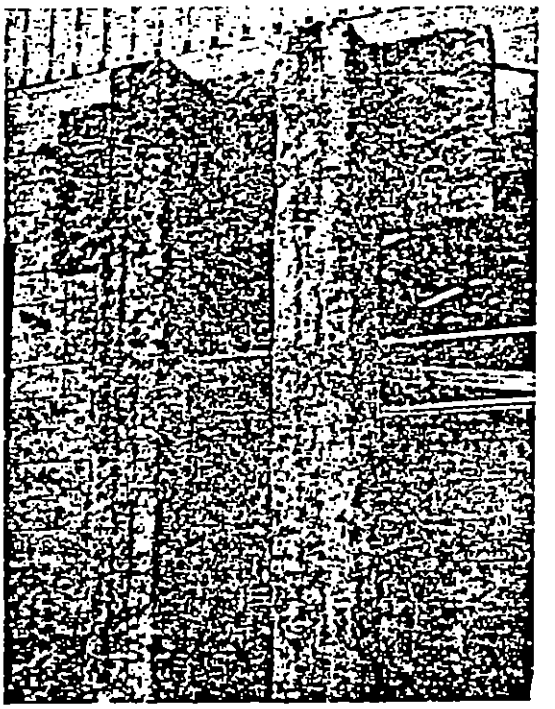


Figure 8
Assembly looking left

Assembly as of July 13, 1966

RESEARCH DEPARTMENT

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9011712

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WABASH 2-6620
CABLE ADDRESS: INTEL

International Testing Laboratories, Inc.

Materials Testing and Consulting Engineers
578-582 MARKET STREET
NEWARK, N. J., 07105
MITCHELL 2-4772-3-4

REPORT OF TEST

No. 297632 DATE Jan. 11, 1966

From Unitdd States Mineral Products Company
Stanhope, New Jersey

Test Procedure:

The Bond Strength Test was conducted in accordance with ASTM C-297. The Samples submitted consisted of CAFCO BLAZE-SHIELD TYPE D applied 3/4" thick untamped to three (3) 6" x 6" steel plates (no adhesive used) - one Galvanized, one Uncoated and one Shop Coated with paint. A 6" x 6" metal plate with a hook on back was adhered to the sprayed fiber face with epoxy adhesive after the fiber had been air dried to equilibrium.

The sample was place horizontally and the steel plae was pulled from the fiber mat.

Test Results:

The Bond Strength Test was conducted in accordance with the Test procedure of this report and the breaking loads were as follows:

Galvanized Steel	:	35 lbs.
Uncoated Steel	:	30 lbs.
Shop Coated Steel	:	28 lbs.
Average Value	:	31 lbs.

Failure occurred within and near the center of the fiber mass resulting in an Average Bond Strength of 124 psf.

Since the material weighed 0.92 lbs. per square foot(14.8 lbs. per cubic foot) the Average Bond Strength is 152 times the weight of the applied fiber, while the Minimum Bond Strength is 122 times the weight of the applied fiber.

To United States Mineral Products Company
Stanhope, New Jersey

The liability of the International Testing Laboratories, Inc. with respect to the services charged for herein, shall in no event exceed the amount of the invoice.

Our reports pertain to the sample tested only. Information contained herein is not to be reproduced, except with our permission.

INTERNATIONAL TESTING LABORATORIES, INC.

Test Report No. 281391 No. of Pages 1

Report of Test on

DUSTING AND FLAKING TEST

OF

CAPCO BLAZE-SHIELD TYPE D FIBER
(UNTAMPED)

International Testing Laboratories, Inc.

NEWARK 5, NEW JERSEY

Date April 27, 1964

	Prepared	Checked	Approved
By	M/ Glenn Gaer		D.N. Hoffman
Signed	M/ Glenn Gaer		D.N. Hoffman
Date	April 27, 1964		April 27, 1964